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Report on an Examination of Dendroctonus ponderosae and D. monticolae

During the last few years considerable difficulty has been experienced in distinguishing between the two species Dendroctonus monticolae Hopk. and D. ponderosae Hopk. in certain infestations in Western States - especially in Southern and Eastern Wyoming, Northern Colorado and Northern Utah. In these areas the distributions of the two species overlap and either or both may occur. The host tree offers little or no aid in identification, for while D. monticolae is found most frequently in lodgepole pine (Pinus contorta) and D. ponderosae most commonly affects ponderosa pine (Pinus ponderosa), either species of bark beetle may attack any of the several species of pine found in the area.

In his Monograph on Dendroctonus, Hopkins distinguished monticolae from ponderosae by "The average smaller size and prevailing moderately impressed elytral striae, with distinct but moderately coarse punctures. While the strial punctures vary in different individuals they are never so coarse as in the average D. ponderosae." These differences do serve to distinguish "average" specimens of the two species but it is unfortunately true that many specimens do not show average conditions either as regards size or sculpture. Thus in any considerable series of specimens of either species, individuals will be found which show more or less strongly the characters of the other species.

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D. ponderosae especially is quite variable, and usually the variation from normal is toward a smaller size and finer sculpture, which results in the variants approaching or attaining the size and sculpture of D. monticolae. Thus Black Hills beetles which have developed in thin dry bark are often so small that the average size falls even below the average for the Mountain pine beetle. In such small specimens the sculpture may be as fine as in typical monticolae. Usually, however, a majority of the specimens have the striae sufficiently impressed and the punctures coarse enough to be recognized as D. ponderosae. Black Hills beetles from hosts other than ponderosa pine are often smaller in average size, and this is expecially striking in series taken from lodgepole pine.

D. monticolae is certainly less variable than the sister species, but series of these beetles taken from a vigorous infestation usually contain specimens which are much larger and coarser in sculpture than is characteristic of monticolae. Such specimens, if examined without data would often be classed as D. ponderosae.

In an attempt to discover some method by which to distinguish between these two species in the doubtful area where both may occur, a number of long series of specimens were obtained from localities where typical ponderosae and typical monticolae were known to occur

and also a considera le number of series from areas in which either or both species might occur. Thus an examination was made of a number of long series of specimens of the ponderosae-monticolae type from several localities, widely separated and differing in other respects, and from several different hosts. All these series of specimens except one were taken in the field, and this one series reared from logs in the laboratory contained so many specimens abnormal as to size and sculpture that the data were discarded.

Some of these series of specimens were obtained from areas where typical D. ponderosae infestations have occurred in the past and where D. monticolae never has been taken - such as in the Black Hills N. F., Montezuma N. F., Uncompahgre N. F., etc. Other series are from areas where only D. monticolae infestations have occurred in the past - such as in the Beaverhead N. F. and Coeur d'Alene N. F. Still other series were obtained from areas such as the Medicine Bow N. F., Elk Mountain, Wy., Ashley, N. F. Utah, where infestations of either D. ponderosae or D. monticolae might well occur.

In all 2888 specimens were critically examined under the binocular microscope and each specimen was recorded as being "typically D. ponderosae," "typically D. monticolae" or "intermediate." On cursory examination of the different series it was immediately evident that the lots of D. ponderosae from ponderosa pine are strikingly larger both in extreme size and in average size than those from other hosts. Those from limber pine are intermediate in size and those from lodgepole pine are markedly smaller in average size although containing a few individuals of normal size. A majority of D. ponderosae from lodgepole pine are well within the sizal limits of D. monticolae and it was also notable that a considerable percentage of these smaller individuals were less likely to show the strongly impressed striae and coarse strial punctures present in typical D. ponderosae, thus approaching or even attaining the structure of D. monticolae.

Of 143 specimens taken from Pinus ponderosa in the Black Hills N. F. 94 per cent are typical Dendroctonus ponderosae. The type locality is at Spearfish, S. D. and most of these specimens came from within about 50 miles of there.

Of 113 specimens taken from P. ponderosa in the Uncompahgre N. F., Colo. 95% are typical D. ponderosae.

Of 256 specimens from P. ponderosa in the Montezuma N. F., Colo. 93% are typical D. ponderosae.

Of 105 specimens from P. ponderosa in the Dixie N. F., Utah 86% are typical D. ponderosae.

Of 185 specimens from P. ponderosa near Monn Lake on the Uintal and Ouray Indian Reservation 89% are typical D. ponderosae.

Of 158 specimens taken from P. flexillis in the Ashley N. F. near Moon Lake 85% are fairly typical D. ponderosae although the series contains many undersized specimens.

Of 76 specimens taken from P. contorta in the Uinta' N. F. 84% are typical D. ponderosae.

Of 657 specimens taken from P. flexilis on Elk Mt., Wyoming, 81% are typical D. ponderosae.

Of 509 specimens taken from P. contorta on Elk Mt., Wyoming 70% are typical D. ponderosae. The average size here is well within the range of D. monticolae and 30% would not be recognized as D. ponderosae on the basis of sculpture. It seems very likely that this is actually a mixed infestation, both species being present in the series.

Of 205 specimens taken from P. contorta in the extreme northwestern part of the Ashley N. F. in Utah only 4% are typical D. ponderosae, while 96% are either typical D. monticolae or are intermediates, which might be placed in either species. While this lot, from field observations was supposed to be D. ponderosae, if anatomical characters are of any value, the infestation in the northwestern part of the Ashley N. F. is D. monticolae, while that farther south in the same forest is D. ponderosae.

Of 100 specimens (No. 17) taken from Pinus contorta in the Beaverhead N. F. in Montana 91% are typical D. monticolae and only 9% are questionable.

Of 103 specimens (No. 16) from Pinus contorta at Sula, Mont. all but two specimens or 99% are typical D. monticolae.

Of 114 specimens obtained from Pinus monticola in the Coeur d'Alene N. F. 98% are typical D. monticolae.

The critical study of these series of specimens was undertaken with the faint hope that such a study might bring to light some character or set of characters which would serve for the ready recognition of the two species in the field. This hope was not realized, as apparently all the anatomical characters differ only in degree and those which are of any practical use vary considerably according to the host and other environmental differences. However, at present, the writer believes he can distinguish the two species if supplied with a series of about 50 specimens, preferably all taken at random from a single tree, or at least from a few trees of the same species in the same immediate locality. In the case of actual mixed infestations (in the same tree) a larger number of specimens is desirable.

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